

White Paper

**Matching BLM Geospatial User Types with ArcGIS
Products**

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Introduction

When providing geospatial technology to a large user base, the requirements of the users need to be considered very carefully. Purchasing a high-end gigahertz workstation for a user that creates a handful of page-size maps for an annual report is just as wasteful as purchasing a network PC for a user performing sophisticated overlay analysis and 3D modeling. In order to crosswalk the types of BLM geospatial users to the ESRI ArcGIS products, the BLM user types and product functionalities must be explained.

The ArcGIS products consist of ArcView, ArcEditor, ArcInfo, ArcIMS, ArcExplorer, ArcReader, and ArcPad. ArcView provides comprehensive mapping and analysis tools along with simple editing and geoprocessing tools. ArcEditor includes the full functionality of ArcView plus advanced editing capabilities for coverages and geodatabases. ArcInfo extends the functionality of both these products to include advanced geoprocessing. ArcIMS provides the foundation for disseminating high-end geographic information systems (GIS) and mapping services via the Internet. Additionally, the software enables users to integrate local data sources with Internet data sources for display, query, and analysis in an easy-to-use Web browser. ArcExplorer and ArcReader add the capability to view BLM GIS data sets using free data viewers. ArcPad is an ESRI mobile client developed for hand-held PDAs that allows users view and capture data outside the traditional local area networks (LANs).

The following four-tiered approach to classifying geospatial technology users has been developed to assist BLM's E-GIS system design team in properly specifying hardware, network, and software requirements for geospatial applications and end-users. Additionally, the ESRI ArcGIS products that best fit the needs of these end-users is included with the basic summary of the functionality supplied by the products.

A detailed listing of each of the ArcGIS desktop product functionalities is included in Attachment 4 – ArcGIS Desktop Products Data Sheet. This will be useful for matching specific desktop products with each user's functionality requirements.

BLM User Levels

First-tier Users or Analyst/Programmers

In the first-tier are the “professional” geospatial users that perform frequent edits of the geospatial database and other intensive interactive tasks, such as spatial and 3D modeling using workstations, performing the work with their local CPU. There are two types of first-tier users. First are the high-level scientific users who need advanced geoprocessing capabilities such as universal multidimensional kriging “optimal prediction”. These users will probably need to export data to special-purpose software, such as a statistical package. Therefore, they benefit from a publish presentation format for the data. The other type of first-tier users is the geospatial data expert. These users enter new data and perform detailed, coordinate-level edits of existing data. These users define networks, routes, and themes for display to third-tier users. Both types of first-tier users often need to do extensive programming and benefit from published APIs and reusable software components.

ESRI ArcGIS products that meet first tier requirements.

ArcInfo provides the following functionalities:

- Data Access
- Mapping
- Customization
- Spatial query
- Simple feature editing
- Coverage editing
- Multi-user geodatabase editing
- Definition of geodatabase relationships
- Additional data management tools
- Advanced topologic coverage editing environment
- Advanced geoprocessing tools
- Remote geoprocessing server
- Complete set of data conversion tools
- Advanced spatial analysis tools
- Dynamic segmentation and linear analysis tools
- Customization environments for cross platform workstation applications
- Data Import and Export

ArcInfo Workstation – Needed to continue support and use of existing BLM Applications developed in AML.

- Arc Macro Language (AML)

Second-tier Users or Editors

This tier identifies the users whose primary focus is to create, edit, and modify the BLM's base data layers within a state organization. Second-tier users are typically on-site contractors or summer interns who have been tasked with basic data capture and conversion. Even though these users are very similar to the first-tier users in their impacts to the architecture, the Bureau has the opportunity to maximize the ROI of an enterprise license agreement with ESRI by identifying users who could effectively complete their geospatial tasks with less expensive GIS software products on a per seat basis.

ESRI ArcGIS products that meet second-tier user requirements.

ArcEditor Functionalities

- Data Access
- Mapping
- Customization
- Spatial query
- Simple feature editing
- Coverage editing
- Multi-user geodatabase editing
- Definition of geodatabase relationships
- Additional data management tools

Third-tier Users or Resource Users

Third-tier users access the database through fat clients, or through thin clients connected to an application server. They need to manipulate the data without being concerned with its physical representation. These users perform sophisticated geospatial operations such as map algebra, vector overlay, and shortest-path analysis. Examples of such a user would be a range specialist who studies annual changes in vegetation cover, a soil scientist who studies erosion potential, or a planner who looks for the best path for a new road or utility corridor. Third-tier users benefit from N-tier architecture, so that the database query language is handled by the application server. If they are writing programs or scripts, these users benefit from a distributed object model, so that their programs are reusable on other platforms or in other environments.

ESRI ArcGIS products that meet third-tier user requirements. It should be noted that the ArcView listed below is in reference to the ArcView 8.x version. However, until the ArcView applications are migrated from Avenue scripts to COM-based languages, there will be a need to have both versions available to the end-user.

ArcView Functionalities:

- Data access
- Mapping
- Customization
- Spatial query
- Simple feature editing

Fourth-tier Users or Browsers

The fourth-tier users access the database mostly through a Web browser or through thin-client tools. They are interested in viewing, rather than changing, the data. They see predefined themes or views as defined by a Webmaster or geospatial data administrator. These users need limited capability tools to pan, zoom, bring different themes to the front, execute rotation and shading of 3-D data, manipulation of the color map, etc. Examples of this user would be a dispatcher who needs a real-time display of the boundaries of a fire, or a member of the public who wants to look at the different proposed alternatives in a resource management plan. Fourth-tier users benefit from the thin-client/open architecture model, so they are not limited to choice of operating system, browser, or plugins. They also benefit from a statewide and nationwide seamless geography. Most of the viewing clients in this tier are available for free; however, the Internet Map Server (IMS) or data publishing software would need to be purchased from ESRI.

ESRI ArcGIS products that meet fourth-tier user requirements.

ArcIMS Functionalities

- Web-enabled data viewing
- Web-enabled data query
- Web-enabled data exchange
- Web-enabled data analysis

ArcExplorer Functionalities

- Basic data viewing
- Basic data query
- Basic data retrieval
- Internet client for Web data and map services

ArcReader Functionalities

- View published GIS maps and services
- Similar to the Adobe Acrobat reader and PDF file format